

Kansas Department of Health and Environment

Bureau of Environmental Remediation/Remedial Section

State Water Plan Contamination Remediation Program



Plugging the Old Lyons Salt Mine

Background:

The Old Lyons Salt Mine was opened by the Lyons Rock Salt Company in 1890 by sinking an 8- by 16-foot rectangular shaft to a depth of 1,024 feet. This shaft was extended into the Hutchinson Salt unit, which is present at a depth of 793 to 1,068 feet below the surface at the site. Rock salt was last produced from this mine in 1948 by the Carey Salt Company (not affiliated with current Carey Salt Company). During this period, salt was mined by the room-and-pillar method, with 9- to 14-foot openings, in an approximate 100-acre area. The salt mine was closed in 1948.

As part of investigations conducted at the site by KDHE's State Water Plan program in 1992 and 1993, both the mine shaft and the mine wastes were evaluated. Mine wastes mapped at the site included salt spoils located at the surface north and west of the shaft, wastes contained in the former salt storage cribs west of the shaft, and miscellaneous mine waste piles elsewhere at the site. Evaluation of the mine wastes indicated they have been significantly leached of constituents such as sodium, chloride, and sulfate. The investigation estimated the volume of mine wastes at the surface at the site to be approximately 11,000 cubic yards. A video inspection of the shaft was performed in November 1992. The inspection indicated that although the shaft was originally excavated to a depth of 1,024 feet, the bottom 23 feet of the shaft was filled with broken rock, shaft timbers, and miscellaneous shaft debris.



Dilapidated condition of old mine works and shaft surface location prior to initiating plugging activities. Pictured to right is the old ventilation fan sitting over the shaft.

Solution:

The Old Lyons Salt Mine closure project was performed to accomplish several objectives, including eliminating a major source of brine contamination in the Lyons area and plugging an unsafe mine shaft that also posed long term liabilities associated with potential shaft instability. Waste excavation focused on the brine-contaminated soils and other mine wastes present near the surface in the northern portion of the site. Approximately 11,000 cubic yards of waste materials were excavated at the site, resulting in excavation depths of up to 6 feet and removal of numerous waste piles. These waste materials were placed in the lower portion of the shaft, thereby stabilizing the shaft walls by preventing ongoing sloughing of the salt and shale formations present. Backfilling rates measured when mine wastes were placed in the shaft confirmed that significant sloughing and/or dissolution had occurred in the Hutchinson Salt unit in the lower 200 feet of the shaft. In addition to mine waste, several low permeability shaft plugs were installed to control ground water seepage into the shaft and prevent additional dissolution of the Hutchinson Salt and other erodible units. Primary hydraulic control in the shaft is provided by a bentonite seal and dowelled concrete bulkhead that were hitched into low permeability claystone. Hydraulic control in the shaft is also provided by a 40-foot thick concrete plug that is keyed into low permeability shale.

Benefits:

- **11,000 cubic yards of surficial wastes removed;**
- **Reduced possibility of catastrophic subsidence or more collapse;**
- **Eliminate a source for groundwater contamination.**



Salt mining wastes and salt contaminated soils are processed and placed in the abandoned mine shaft prior to plugging.



Preparation for final concrete cap over plugged salt mine shaft.